

WHAT IS CLAIMED IS:

1. A method of switching between a live video decoding and a recorded playback in a digital video and recording system, comprising:
 - (a) receiving a stream of digital video data;
 - (b) transmitting the received video data stream to a video decoder without first looping the video data stream through a playback buffer;
 - (c) decoding the video data with the video decoder;
 - (d) if a command is received that requires the video data stream to be looped through a playback buffer prior to further decoding, performing steps of:
 - (e) transmitting the video data stream to a first-in first-out playback buffer and storing the video data in the buffer;
 - (f) marking a data element of the video data stream that was last transmitted to the video decoder;
 - (g) if a command requiring decoding of the video data stream to resume is received, performing steps of:
 - (h) transmitting the video data stored in the playback buffer to the video decoder; and
 - (i) decoding the video data received from the playback buffer starting at one of the data element marked in marking step (f) and a point immediately after the data element marked in marking step (f).
2. The method of claim 1 further comprising: if a command that requires the video data stream to be looped through a playback buffer prior to further decoding is received pursuant to step (d), performing a step (j) of halting transmission of the received video data stream to the video decoder.
3. The method of claim 2 wherein halting step (j) comprises immediately halting transmission of the received video data stream to the video decoder.

4. The method of claim 2 wherein halting step (j) comprises halting transmission of the received video data stream to the video decoder at a next transport packet boundary.
5. The method of claim 1 wherein marking step (f) comprises saving an address that points to a data byte of the video data stream that was last transmitted to the video decoder.
6. The method of claim 1 wherein marking step (f) comprises marking a transport record offset of a data element of the video data stream that was last transmitted to the video decoder.
7. The method of claim 6 wherein marking step (f) comprises marking a transport record offset of a data byte of the video data stream that was last transmitted to the video decoder.
8. The method of claim 6 wherein marking step (f) comprises storing the transport record offset in an offset data register.
9. The method of claim 1 wherein the command that requires the video data stream to be looped through a playback buffer prior to further decoding is one of a pause command, a slow motion command, a record command and a normal-playback command.
10. The method of claim 1 wherein once a command requiring decoding of the video stream to resume is received pursuant to step (g), and transmitting step (h) and decoding step (i) are initiated, subsequent decoding of the video data stream is accomplished by sending the video data stream through the playback buffer before sending the video data stream to the video decoder.
11. The method of claim 10 wherein the digital video and recording system comprises a digital television system and wherein the method further comprises:

(j) if a channel-change command is received, repeating steps (a) - (i) for the video data stream of the new channel.

12. The method of claim 1 further comprising a step (j), performed after transmitting step (h) and prior to decoding step (i), of updating a system time clock using a timing reference element embedded in the video data stream.

13. A method of switching between a live video decoding and a recorded playback in a digital video and recording system, comprising:

- (a) receiving a stream of digital video data;
- (b) transmitting the received video data stream to a first-in first-out video decoder buffer without first looping the video data stream through a playback buffer;
- (c) transmitting the video data stream from the video decoder buffer to a video decoder and decoding the video data with the video decoder;
- (d) if a command is received that requires the video data stream to be looped through a playback buffer prior to further decoding, performing steps of:
 - (e) transmitting the video data stream to a first-in first-out playback buffer while continuing to transmit the video data stream to the video decoder buffer;
 - (f) storing the video data in the playback buffer;
 - (g) halting transmission of the video data stream to the video decoder buffer when the video decoder buffer fills up;
 - (h) marking a data element of the video data stream that was last transmitted to the video decoder buffer;
 - (i) if a command requiring decoding of the video data stream to resume is received, performing steps of:
 - (j) transmitting the video data stored in the video decoder buffer to the video decoder and decoding the video data with the video decoder; and

(k) transmitting the video data stored in the playback buffer to the video decoder buffer starting at one of the data element marked in marking step (h) and a point immediately after the data element marked in marking step (h).

14. The method of claim 13 wherein marking step (h) comprises saving an address that points to a data byte of the video data stream that was last transmitted to the video decoder.

15. The method of claim 13 wherein the command that requires the video data stream to be looped through a playback buffer prior to further decoding is one of a pause command, a slow motion command, a record command and a normal-playback command.

16. The method of claim 13 wherein once a command requiring decoding of the video stream to resume is received pursuant to step (i), and transmitting steps (j) and (k) are initiated, subsequent decoding of the video data stream is accomplished by sending the video data stream through the playback buffer before sending the video data stream to the video decoder buffer.

17. The method of claim 16 wherein the digital video and recording system comprises a digital television system and wherein the method further comprises:

(j) if a channel-change command is received, repeating steps (a) - (i) for the video data stream of the new channel.

18. The method of claim 1 further comprising: if a command requiring decoding of the video data stream to resume is received pursuant to step (i), performing a step (l) of updating a system time clock using a timing reference element embedded in the video data transmitted to the video decoder.

19. A digital video and recording system comprising:

a first-in first-out video decoder buffer adapted to receive a stream of digital video data, to store the video data, and to transmit the video data stream to a video decoder;

a video decoder adapted to decode the video data stream received from the video decoder buffer;

a first-in first-out playback buffer adapted to receive the video data stream, to store the video data, and to transmit the video data stream to the video decoder buffer; and

a controller that sends the received video data stream to the video decoder buffer during normal operation, but wherein if a command is received that requires the video data stream to be looped through a playback buffer, the controller sends the video data stream to the playback buffer while continuing to send the video data stream to the video decoder buffer, wherein when the video decoder buffer fills up, the controller halts transmission of the video data stream to the video decoder buffer and marks a data element that was last provided to the video decoder buffer, and wherein if a command causing decoding of the video data stream to resume is received, the controller causes the video data stored in the video decoder buffer to be transmitted to the video decoder and causes the video data stored in the playback buffer to be transmitted to the video decoder buffer starting at one of the marked data element and a point immediately after the marked data element.

20. The system of claim 19 wherein the controller marks the data element that was last provided to the video decoder buffer by saving an address that points to a data byte of the video data stream that was last transmitted to the video decoder.

21. The system of claim 19 wherein the command that requires the video data stream to be looped through a playback buffer prior to further decoding is one of a pause command, a slow motion command, a record command and a normal-playback command.

22. The system of claim 19 wherein once a command requiring decoding of the video stream to resume is received, the controller effects subsequent decoding of the video data stream by sending the video data stream through the playback buffer before sending the video data stream to the video decoder buffer.

23. The system of claim 22 wherein the digital video and recording system comprises a digital television system and wherein if a channel-change command is received, the controller sends the video data stream of the new channel to the video decoder buffer without first looping the video data stream through the playback buffer, but wherein if a command is received that requires the video data stream to be looped through a playback buffer, the controller sends the video data stream to the playback buffer.

24. A method of switching between a live video decoding and a recorded playback in a digital video and recording system, comprising:

- (a) receiving a digital video data stream in a first data path;
- (b) decoding the video data received in the first data path;
- (c) receiving a first PVR command;
- (d) receiving the video data stream in a second data path;
- (e) marking a data element of the video data stream in the first data path when the first PVR command is received;
- (f) comparing the marked data element in the first data path with the video data stream received in the second path; and
- (g) decoding the video data received in the second data path after the marked data element in the first data path matches a data element in the video data stream in the second path.

25. The method of claim 24 wherein the first PVR command is one of at least a pause, a record, and a slow motion.

26. The method of claim 24 further comprising receiving a second PVR command.
27. The method of claim 26 wherein the second PVR command is a play command.
28. The method of claim 24 further comprising halting receipt of the video data stream in the first data path after at least one of the first PVR command and the second PVR command is received.
29. The method of claim 24 wherein marking step (e) comprises saving an address that points to a data byte of the video data stream in the first data path that was last transmitted to a video decoder.
30. The method of claim 24 wherein marking step (e) comprises marking a transport record offset of a data element of the video data stream in the first data path that was last transmitted to a video decoder.
31. The method of claim 24 wherein marking step (e) comprises marking a transport record offset of a data byte of the video data stream in the first data path that was last transmitted to a video decoder.
32. The method of claim 30 wherein marking step (e) comprises storing the transport record offset in an offset data register.
33. The method of claim 24 wherein the second data path comprises at least one playback buffer.
34. The method of claim 2 further comprising steps of:
- (h) receiving a channel-change command; and

(i) decoding the video data received in the first data path after the change-channel command is received.